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Breeding Systems in Pig Farming

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There are two types of breeding methods viz. natural mating and artificial insemination. In natural mating, a male (boar) of superior breed characteristics is used for mating. In field conditions, only a small section of farmers have their own boar and they are being used without giving emphasis on genetic value, breed and quality of boar. To produce better piglets with larger litter size, only the best quality breeding boar available in the locality should be used.

In Artificial insemination (A.I.), semen from a proven boar is artificially collected, evaluated for quality and deposited into the cervix of a receptive sow (during estrus period). Both collection and insemination are accomplished through artificial means. This technology provides unique opportunity for the genetic improvement of the species of animal to which it is applied. Additionally, it offers most economically sound method of maintaining genetic variability in a positive direction.

Advantages of Artificial Insemination (A.I.)

There are several advantages, but the most important ones are listed below:

1. Enables widespread use of superior male germplasm to produce genetically upgraded progenies.
2. Allows the use and transport of semen at distances, even crossing international barriers
3. Reduces risk of sexually transmitted diseases
4. Allows introduction of new genetic material. It also reduces the transmission of coital diseases and other infectious diseases like Swine Fever, Foot and Mouth Disease etc.
5. Al can be used extensively in development of rotational or terminal crossbreeding programs
6. AI overcomes size differences between boars and sows.

Estrus period in pigs: Estrus is the period during which the female pig is receptive to the male (boar) (i.e. will stand to be mated). Average length of estrus cycle in pig is 21 days with a range of 18-24 days. Estrus or heat signs remain for 2-3 days. *Regular and accurate estrus detection is an essential component and a valuable tool in swine A.I.* Estrus duration is variable, gilts average 38 hours and sows ranges from 50 to 72 hours. Females should be checked for estrus once or twice daily as close as possible at 12-hours interval. It is ideal to perform heat detection when the animals are relaxing during normal activities; avoid times of increased excitement or stressful situations, such as feeding.

Noticeable signs of estrus include:

1. "**Stance reflex**" or standing reflex: The primary sign of estrus occurs when the female stands immobile while another sow or boar mounts
2. Reddening and swelling of vulva, presence of sticky mucus at vulva
3. Increased vocalizations with erect ears, tail upright, frequent urination
4. Mounting other females and/or standing to be mounted by other females
5. Nervous and restless behavior and decreased appetite

A farmer or herds-person can perform '**back pressure test**' which consists of applying pressure onto the females' loin so that the sow in estrus stands rigid, arches her back and pricks up her ears. If pressure is applied to the back and the sow is not in estrus, she will move in an attempt to escape. The timing of AI in relation to ovulation is important, and the timing of ovulation so variable, that it is preferable to carry out estrus detection twice a day. Any gilt showing signs of estrus should be recorded, even if no mating is planned at that time.

Artificial Insemination-Important points to note

1. Timing and technique are two key factors in the successful use of AI.
2. The stockperson must mimic some of the stimulation normally provided by the boar i.e. back pressure, flank/udder rubbing. Use adequate lubrication (non-spermicidal KY jelly)
3. Strict hygienic measures should be taken while handling semen and during insemination.
4. Clean the vulva with cotton to clean away dirt that may contaminate the catheter head. Do not hold the catheter in the mouth and always use a new/sterilized catheter on each sow.

Semen quality is compromised by rough handling, temperature shock & exposure to light

Pre-requisites for AI: Pre-requisites for AI include a supply of quality pig semen, reliable methods for estrus or heat detection in the breeding sow and a means of inseminating the semen into the reproductive tract of the receptive female.

Procedure of A.I. in pigs: Make sure the sow or gilt is in standing heat. The catheter should be properly cleaned and disinfected. The lips of the vulva are gently parted, to allow the head of the catheter to be inserted and to only have contact with the interior of the vulva. The head of the catheter is inserted into the vulva (by gentle anti-clockwise twisting) and gently pushed forward and upwards at an angle of 45 degrees into the reproductive tract, being careful to miss the entrance to the bladder. When a firm resistance is felt, the catheter is pulled slightly back to achieve a firm lock. Once the catheter is firmly locked in place, the semen bag is fitted on to the catheter and raised above the level of the vulva. The uterine contractions will suck the semen out of the bag, into the uterine tract. Gentle squeezing pressure can also be exerted for proper and uniform flow of semen. Continue to stimulate the animal by putting weight on her back and rubbing her flanks. After insemination, rotate catheter clockwise and withdraw it.

Timing of AI: Timing and technique are two key factors in the successful use of AI. Accurate timing depends upon accurate estrus detection. Viable sperm must be present in the sow's uterus before ovulation occurs. After ovulation, the oocytes (eggs) have a short lifespan of about 8 hours. Once inside the sow's reproductive tract, sperm cells survive for around 24 hours. Ovulation timing is variable in different individuals, breeds or age groups. It is generally accepted that ovulation occurs approximately 66-75% into standing estrus. The general timing of AI separately for gilts and sows are depicted below:

Groups	Single AI after detected estrus	Double AI after first detected estrus/heat
Gilts	24 – 30 hrs (10-14 hrs after SR)	1st AI: 10-14 hrs (6 hrs after SR) 2nd AI: 12 hrs-after 1st AI
Sows	28 – 36 hrs (12-16 hrs after SR)	1st AI: 12-16 hrs (6-8 hrs after SR) 2nd AI: 12 hrs-after 1st AI

Post-Insemination care: The catheter is left in the sow for 5 minutes to continue the cervical stimulation and maintain uterine contractions. At the end of semen uptake, the catheter should be doubled over and bound in this position to prevent prevents "back flow" of semen. Check the animal for standing heat 12 and 24 hours after the last insemination. Ideally, she will stop standing within 12 hours of insemination. Record dates of A.I., 21-day check- back date, due date, boar ID and any events like bleeding or other observations. Regular estrus detection (for non-return rate) and routine pregnancy diagnosis are advised to assess the conception and pregnancy.